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Chapter 2 COMPUTER COMPONENTS

1) Print 45 + 10 is a
(a) Direct (b) Indirect (c) Both a & b (d) None

2) BASIC was developed by John Kemeny and Thomas Kurtz in 1963 at
(a) Preston College (b) Hovered university
(c) London university (d) Dartmouth College

3) How many modes of operations in BASIC?
(a) 1 (b) 2 (c) 3 (d) 4

4) Which of the following is keyword?
(a) ABC (b) START (c) BASIC (d) PRINT

5) BASIC character set consists of
(a) Alphabetic (b) Numeric (c) Special (d) All

6) Alphabetic character consist of
(a) Special characters (b) Digits
(c) Numeric characters (d) Small English

7) Solve the expression 5 + 2 * 3
(a) 11 (b) 21 (c) 13 (d)10

8) In BASIC all addition and subtraction are made from
(a) Left to right (b) Right to left (c) No sequence (d) None

9) Which of the following is not a command in BASIC?
(a) RUN (b) READ (c) LIST (d) SAVE

10) The SAVE statement in BASIC transfers a program from
(a) Primary storage to secondary storage (b) Secondary storage to primary storage
(c) One secondary storage device to another (d) ROM to RAM

11) Comma between the variables in Print statement divide the screen in zone
(a) 2 (b) 3 (c) 4 (d) 5

12) How many data types in BASIC?
(a) 1 (b) 2 (c) 3 (d) 4

13) A complete BASIC program is written in
(a) Indirect mode (b) Direct mode (c) Active mode (d) Full mode

14) 0,1,2,3,4,5,……..9 is called characters
(a) Numeric (b) Alphabetic (c) Special (d) All

15) $, ^ & * are called
(a) Numeric (b) Alphabetic (c) Special (d) All

16) BASIC language was developed in
(a) England (b) India (c) USA (d) China

17) Which of the following languages was developed to address the complexity issues of older languages?
(a) COBOL (b) PASCAL (c) ASSEMBLY (d) BASIC

18) The residential address of a person will be
(a) Alphanumeric (b) Numeric (c) Alphabetic (d) Special character

19) If A = 74 and it remains 74 during execution of the program then A is
(a) Character (b) Constant (c) Variable (d) Reserve word

20) An example of BASIC command is
(a) LET (b) DATA (c) END (d) None

21) Which of the following is assignment operator in BASIC
(a) + (b) - (c) = (d) All

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22) A program in BASIC consists of a set of instructions or _____ each of which is preceded by a number called a line number.
(a) Commands (b) Algorithm (c) Statements (d) Flowchart

23) In BASIC is something that does not change its value during execution of program.
(a) Variables (b) Constant (c) String (d) Numbers

24) Which of the following represents is numeric data constant?
(a) "1992" (b) "1992-98" (c) "KIPS" (d) 2008

25) The maximum value of statement line number is
(a) 255 (b) 65529 (c) 65536 (d) 155

26) What is the last letter of string variable name?
(a) ! (b) $ (c) @ (d) #

27) How many logical operators used in BASIC?
(a) 1 (b) 2 (c) 3 (d) 4

28) Which statement is used to assign the vales of variables?
(a) READ (b) INPUT (c) RESTORE (d) LET

29) GW-BASIC is an
(a) Interpreter (b) Compiler (c) Interpreter (d) All

30) Which of the following BASIC interpreter provides a menu driven environment to write and execute its program?
(a) GW-BASIC (b) TBASIC (c) QBASIC (d) None

31) BEDMAS is the
(a) Control statement (b) Key word
(c)Constant (d) Hierarchy of arithmetic operators

32) A numeric variable always has a value which is
(a) Zero (b) One (c) Unpredictable (d) All

33) Identify the string variable
(a) A (b) A$ (c) A% (d) A#

34) Which of the following is a short key to run a program in GW-BASIC?
(a) F4 (b) F2 (c) F1 (d) F3

35) If two or more statements are written on a line, they must be separated by a
(a) Hyphen (b) Semi colon (c) Comma (d) Colon

36) BASIC language is developed in
(a) 1960 (b) 1961 (c) 1962 (d) 1963

37) The BASIC statement for transfer the value stored in P to Q could be
(a) INPUT P = Q (b) LET P = Q (c) LET P / Q = 1 (d) LET Q = P

38) In BASIC which statement is used to assign large number values of variables?
(a) LET (b) INPUT (c) OUTPUT (d) READ...DATA

39) Which statement in BASIC makes it possible to used DATA values again beginning from the first value listed in DATA statement?
(a) INPUT (b) OUTPUT (c) RESTORE (d) LET

40) Which of the following BASIC command is used to print the list of loaded program statements on the printer attached to the computer?
(a) LIST (b) LPRINT (c) VIEW (d) LLIST

41) Which statement is used to display numbers and string on the screen?
(a) PRINT (b) LPRINT (c) LLIST (d) All

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42) Which of the following is the default extension of a GW-BASIC program?
(a) COM (b) BAT (c) EXE (d) BAS

43) If we intend to write 1024^2 in BASIC we will write it as
(a) 10242 (b) 1024^2 (c) 512^2 (d) 1024 ^ 2

44) In BASIC a constant can be of the type
(a) String (b) Numeric (c) Both a & b (d) None

45) Which of the following is a legal variable name in BASIC?
(a) A+B (b) A B (c) 2A (d) A2

46) Which of the following BASIC command is used to generate the line number automatically each time when enter key is pressed?
(a) LIST (b) LLIST (c) AUTO (d) LOAD

47) The maximum length of a variable name in GW-BASIC is
(a) 40 (b) 32 (c) 31 (d) 45

48) A GW-BASIC program line cannot have more than characters
(a) 240 (b) 245 (c) 250 (d)255

49) The INPUT statement puts a question mark ? on the screen which means
(a) Enter value for the variable (b) Enter name of the variable
(c) Invalid statement (d) A = 10

50) Which of the following is a type declaration character for integer variable?
(a) ! (b) % (c) # (d) $

ANSWER KEY

1	A	11	B	21	C	31	D	41	A
2	D	12	B	22	C	32	A	42	D
3	B	13	A	23	B	33	B	43	D
4	D	14	A	24	D	34	B	44	C
5	D	15	C	25	B	35	D	45	D
6	D	16	C	26	B	36	D	46	C
7	A	17	D	27	C	37	D	47	A
8	A	18	A	28	D	38	D	48	D
9	B	19	C	29	C	39	C	49	A
10	A	20	D	30	C	40	D	50	B

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Chapter 2 COMPUTER COMPONENTS

SHORT QUESTIONS

Q1: What is BASIC language?

BASIC LANGUAGE

BASIC stands for Beginner's All purpose Symbolic Instruction Code. BASIC is high level language. It was developed by John Kemeny and Thomaz Kurtz in 1963. It was invented for beginners and students to teach the fundamental concepts of programming. It is easy to learn and to write a compute program.

Q2: What is direct mode?

DIRECT MODE

In direct mode BASIC command or statement is executed as soon as it is typed and Enter key is pressed. The statement is written without a line number. After execution the statement is cleared from the memory.

Q3: What is indirect mode?

INDIRECT MODE

This mode is used to write a complete program. Each statement of the program is written preceded by a line number. The program written in this mode is stored into the computer memory. The program is executed by RUN command.

Q4: What is meant by executing the program?

EXECUTING THE PROGRAM

Running the program on the computer to solve the problem is called executing the program.

Q5: What is the difference between direct and indirect mode?

DIFFERENCE BETWEEN DIRECT AND INDIRECT MODE

DIRECT MODE	INDIRECT MODE
1. There is no line number in direct mode.	1. It must be start with line number.
2. Commands are written in direct mode.	2. Statements are written in indirect mode.
3. The output comes when we press the enter key.	3. The output comes when we press the F2 or type Run command.

Q6: What is the procedure to save a file in GW-BASIC?

PROCEDURE TO SAVE A FILE

Following procedure is used to save a file

1. Press the F4 key or type SAVE command
2. Type a valid name is quotes for the program
3. Press Enter Key
4. The file is save under the specified name.

Q7: What is the procedure to loading a saved file in GW-BASIC?

PROCEDURE TO LOADING A SAVE FILE

Following procedure is used to load a file

1. Press the F3 key or type LOAD command
2. Type a valid name of an existing file.
3. Press Enter Key
4. The file is loaded into memory, and is ready to list, edit, or run.

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Q8: Describe the structure of BASIC program?

STRUCTURE OF BASIC PROGRAM

Every BASIC program should follow the following rules.

1. Every program statement must begin with a line number.
2. It is a good practice to end every BASIC program with an END statement. However it is not mandatory.
3. Repetition of line numbers within a program is not allowed.
4. Two or more statements can be written on a line but they must be separated by a colon:
5. In BASIC, variables can be used without declaration.
6. In a BASIC program, the physical appearance of the program statements does not matter.

Q9: What is meant by character set of a language?

CHARACTER SET OF A LANGUAGE

Character set of a language defines all characters that can be used to write program in that language. The character set of GW-BASIC language consists of alphabets, numeric digits and special characters.

Q10: What are reserved words?

RESERVED WORDS?

The words which have predefined meanings and purpose is called reserved words. It is also called keywords. Reserve words include all BASIC commands, statements, function names and operators names. It cannot use as a variable name. e.g. print, Let, Input etc.

Q11: Define variables?

VARIABLES

A quantity that might change its value during the execution of program is called variable. Variables are named memory locations that are used to store program's input data and processing results during program execution.

Q12: What is the function of Save Command in BASIC?

FUNCTION OF SAVE COMMAND

This command is used to save the file on disk. If the option 'A' is specified with the save command, the file is saved in ASCII format. If the option P is specified with the save command, the file is saved in encoded binary format.

Q13: What are type declaration characters?

TYPE DECLARATION CHARACTERS

Type declaration characters represent the type of variable. Following type declaration characters are recognized in GW-BASIC

Character	Type of variable
$	String variable
%	Integer variable
!	Single-precision variable
#	Double precision variable

Q14: What is String variable?

STRING VARIABLE

A sequence of character is called a string and variable that are used to assign strings are called string variable. A string variable is followed by a dollar sign ($).

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Q15: What are the constant?

CONSTANT

A quantity that cannot change its value during the execution of program is called constant. There are two types of constant.

1. Numeric Constant
2. String Constant

Q16: What is numeric constant?

NUMERIC CONSTANT

Numeric constant consists of integers, single precision, or double precision numbers. Integer constants represents values that are counted and do not have fractional part e.g +90, -786, 1 etc.

Q17: Define Single precision constants?

SINGLE PRECISION CONSTANT

A single precision constant is any numeric constant with either

1. Seven or fewer digits
2. Exponential form using E
3. A trailing exclamation point (!)

Q18: Define Double precision constants?

DOUBLE PRECISION CONSTANT

A double precision constant is any numeric constant with either

1. Eight or more digits
2. Exponential form using D
3. A trailing number sing (#)

Q19: What are string constants?

STRING CONSTANT

It consists of a set of all types of characters enclosed in double quotation marks. The maximum length of a string is 255 characters. The example of string constants are

- " 30- A Johar Town Lahore" " I Love Pakistan"

Q20: What is meant by string concatenation?

STRING CONCATENATION

Combining one string to another string is called string concatenation. String concatenation can be applied to string constants and variables. In BASIC '+' symbol is used for string concatenation.

Example

```
10 Let A $ = "Punjab Text"
20 Let B $ = "book Board "
30 Print A$ + B$
40 End
```

Out put

Punjab Textbook Board

Q21: What are Operators?

OPERATORS

Operators are symbols that are used to perform certain operations on data. In BASIC, the commonly used operators are

1. Arithmetic operators
2. Relational operators
3. Logical operators
4. Assignment operators

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Q22: What is arithmetic expression?

ARITHMETIC EXPRESSION

Arithmetic expression is a combination of variables, constants and arithmetic operators. Arithmetic expression is evaluated from left to right. It gives only a single value after evaluation.

Q23: What is relational expression?

RELATIONAL EXPRESSION

An expression that contains two operands and one relational operator between these operands is called relational expression.

Q24: What is Type conversion?

TYPE CONVERSION

When the programmer tries to convert a value from one data type to another. This is referred to as type conversion.

Q25: What is a LET statement?

LET STATEMENT

LET statement is an assignment statement. It is used to assign a value into a variable. It is also used to evaluate an arithmetic expression and to assign the calculated value of the expression to a single variable. LET is a reserved word. Its use is optional.

Syntax

Line # LET variable = expression

Q26: What is the purpose of READ.....DATA statements?

READ.....DATA STATEMENTS

READ.....DATA statements are used to assign values to a list of variables. READ statement may consists of a list of variables. DATA statement may consist of list of values that are assigned to the list of variables given in READ statement.

Syntax

LINE # READ comma separated list of variables

Q27: What is the use of Restore statement?

RESTORE STATEMENT

Restore statement is used to restore the values given in a DATA statement and these values can be read once again

Syntax

RESTORE [line number]

Q28: What is INPUT statement?

INPUT STATEMENT

The INPUT statement is used to get values from user and assign to the variables during program execution. When this statement encounters during program execution, the computer waits for entering values from user through keyboard. When user types value from keyboard and then press the enter key, the value is assigned to variable into memory.

Syntax

LINE # INPUT [;] [prompt string] comma separated list of variables

Q29: What is the function of PRINT statement?

PRINT STATEMENT

PRINT statement is used to display the values of variables on the monitor. Print statement is used to produce the softcopy. It can be used both in direct mode as well as indirect mode. We can also used ? mark in print statement instead of Print.

The general syntax of print statement is

PRINT [list of expression] [;]

? [list of expression] [;]

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Q30: What print using statement?

PRINT USING STATEMENT

This command is used to print the numbers and strings in a specified format.

The Syntax of **PRINT USING** statement is

PRINT USING format string; list of variables/expressions/constants [;]

Q31: What is the use of REM statement?

REM STATEMENT

This is a non-executable statement and is used to add explanatory remarks in the program.

Syntax

- REM [remarks]
- ' [remarks]

Q32: What is input statement?

INPUT STATEMENT

The INPUT statement is used to input data from the user during the execution of the program.

SYNTAX:

INPUT [;] [Prompt string ;] comma separated list of variables
INPUT [;] [Prompt string ,] comma separated list of variables

LONG QUESTIONS

Q1: What are the constant? Also describe the type of constant used in GW-BASIC.

CONSTANT

A quantity that cannot change its value during the execution of program is called constant.

TYPES OF CONSTANT

In BASIC there are two types of constants. These are

1. Numeric constants
2. String constants

Numeric constants

It consists of only numeric values including negative or positive numbers. The plus sign is optional for positive numbers. The comma cannot be specified into numeric values. The numbers are written using double quotation marks. The arithmetic operations can be done on numeric constant.

Types of Numeric constant

The Numeric constant may consist of

1. Integer constant
2. Single precision constants
3. Double precision constants

1. **Integer constants**

These are whole values and have no fractional part. For example of integer constants are +56, -678, 8, 4 etc.

2. **Single precision constants**

Single precision constants represent values that have fractional part. For example 4.26, 3.2933, 8.2 etc. The single precision constants have accuracy of values up to 6 digits after decimal point.

The single precision constants may also be represented as

- Exponential form using E sign such as 3.15 E-04
- Using exclamation sign (!) such as 56.4

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3. Double precision constants

Double precision constants also represent the values that have the decimal point, but they have 17 digits of precision. It means that these values have accuracy up to 17 digits after the decimal point. The double precision constant may also be represented as

- Exponential form using D such as 5.3216D-06
- Using # sign such as 321.0#

String Constants

It consists of a set of all types of characters enclosed in double quotation marks. The maximum length of a string is 255 characters. The example of string constants are

- " 30- A Johar Town Lahore" " I Love Pakistan"

Q2: What are operators? Explain each of them.

OPERATORS:

Operators are symbols that are used to perform certain operations on data. In BASIC, the commonly used operators are

1. Arithmetic operators
2. Relational operators
3. Logical operators
4. Assignment operators

ARITHMETIC OPERATORS

Arithmetic operators are used to perform arithmetic operations on values. The GW-BASIC defines the following standard arithmetic operators.

Operator Symbol	Purpose	Algebraic Expression	BASIC Expression
+	Used to add two numbers	A + B	A + B
-	Used to Substract one number from another number	A – B	A – B
*	Used to multiply two numbers	A X B	A * B
/	Used to divide two numbers	A / B	A / B
^	Used to compute the exponential power of a number	A^n	A ^ n
MOD	Used as a modulus operator. It divides integer number and returns the reminder as result.	A MOD B	A MOD B
\	Used to divide integer numbers. It divides integer numbers and returns the quotient as Result.	A \ B	A \ B

On the above table , first five operators are straightforward. The last two operators are modulus and integral division.

- Modulus (MOD) operator always returns the reminder of the integral division.
- Integral division return the quotient of the integral division.

RELATIONAL OPERATORS

Relational operators are use to compare two values. They return output as True or False. If result is True then non-zero value is returned. In case of False, 0 value is returned. In BASIC there are six basic relational operators. These are describe below. Suppose a, b and c are three variables having values 4, 11 and 4 respectively.

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Operation	Symbol	Expression	Evaluation
Equal to (comparison)	=	A = C	True (non zero)
Less than	<	B < A	False (zero)
Greater than	>	A > C	False (zero)
Less than or Equal to	<=	A <= B	True (non zero)
Greater than or Equal to	>=	B <= A	False (zero)
Not Equal to	<>	A <> B	True (non zero)

LOGICAL OPERATORS

Logical operators are used to form more complex and useful logical conditions typically, the logical operators are used to combine more than one relational expressions and the resulting expression is called the compound expression. The logical operators used in BASIC are:

Operator	Meaning
AND	Used to combine two relational expressions and returns True if both expression are True. In this case if first expression is False, the evaluation process is stopped at that point and second expression is not evaluated.
OR	Used to combine two relational expressions and returns True if either of the expressions is True. In this case, if first expression is False, the evaluation process will continue and second expression is evaluated and so on.
NOT	Used to reverser the result of the relational expression. It means that if the condition evaluates to True, the logical operator NOT converts the result to False and vice versa.

ASSIGNMENT OPERATOR

The assignment operator is used to assign a value into a variable. The value may be string, numeric value or a computational result of an expression. In BASIC the assignment operator is represented by '=' symbol.

Q3: What is assignment statement?

The statement that is used to assign a value to a variable is called assignment statement. In BASIC LET statement is used as assignment statement. It is also used to evaluate an arithmetic expression and to assign the calculated value of the expression to a single variable.

The syntax of let statement is

LET variable = expression

Where

LET

it is a reserved word. In some version of BASIC, the use of word LET is optional. It means that assignment statement can also be written without using the word LET.

Variable

Specifies the name of variable to which the value of the expression is to be assigned. The variable type should be the same as data type of value returned be the expression.

Indicates the assignment operator used to assign the value of the expression to the variable.

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Expression

Specifies an expression or a single constant value or variable name.

Q4: How are Statement written in BASIC language?

Programs in BASIC language are written in a sequence which consists of a series of statement. Each statement in a program must start with a statement number. These numbers can go from 1 to 99999 and must be integer.

PURPOSE FOR USING STATEMENT NUMBERS

These numbers are used for the following purpose

- The computers use them to assign a memory location for the statement
- The numbers tell the computer about the order of execution of the program statements.

Q5: Describe the INPUT statement with example?

INPUT STATEMENT

The INPUT statement is used to input data from the user during the execution of the program.

SYNTAX:

INPUT [;] [Prompt string ;] comma separated list of variables
INPUT [;] [Prompt string ,] comma separated list of variables

Prompt string

- Prompt string represent the message that will be displayed on the screen. It helps the user to input correct data.
- If semicolon is given at the end of prompt-string then a question mark (?) will appear at the end of message when INPUT statement is executed. If comma (,) is used instead of semicolon (;) at the end of prompt-string, then question mark is not printed.
- The use of prompt string is optional. If it is omitted then a question mark (?) is printed to

List of Variables

- Indicate that the computer is waiting for input.
- Represents the list of variables to assign the input values. During execution of program, the values entered by the user are assigned to the corresponding variables according to the same sequence in which they are specified. The input data must agree with the type specified by the variable name.

Example 1:

```
10 Input  a
20 Input  b
30 Print a + b
40 End
Run
Ok
? 8
? 6
14
```

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Example 2:

```
10 Input "Enter the Number" , a
20 Let B = a * a
30 Print "Square of a number is " , B
40 End
Run
Ok
Enter the Number 5
Square of a number is 25
```

Q6: Explain the use of READ / DATA statement with the help of examples?

READ.....DATA STATEMENT

READ statement is used to assign numeric and non numeric values to the variables. These values are supplied in DATA statement. There should be one to one correspondence between variables of the READ statement and constant values of the DATA statement.

Syntax:

```
Line no READ list of variables
Line no DATA list of variables
```

Example:

```
10 Read A, B, C
20 Data 5, 10, 15
```

In the above example A will be assigned the value 5, B will be assigned the value 10 and C will be assigned the value 15.

DATA statement is used only with a READ statement. If a READ statement contains more variable than constants in the corresponding DATA statement, zero will be assigned to the variable. If it is the other way round, then the extra constants will be ignored.

Two types of variables are used in READ statement, one is a numeric variable for which the numeric data is used in DATA statement, whereas the other data type is string where the corresponding value used in the DATA statement must be of the string type.

Example No 1

```
10 Read A, B$
20 Data 9, Ali
```

In the above example, A is a numeric variable and the numeric valued of 9 will be assigned to it from the DATA statement, while B$ is a string variable and the non numeric value i.e Ali will be assigned to it.

Q2: Write a detail note on Print statement.

PRINT STATEMENT

PRINT statement is used to display the values of variables on the monitor. Print statement is used to produce the softcopy. It can be used both in direct mode as well as indirect mode. We can also used ? mark in print statement instead of Print.

The general syntax of print statement is

PRINT [List of variables/expression] [;]

? [List of variables/expression] [;]

Where

LIST OF EXPRESSION

List of variables/expression represents the list of variables or expressions separated by comma or semicolons. String constants are written in double quotation marks.

[;]

If semicolon is given at the of PRINT statement then print control does not shift to the next line.

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?

You can also use ? mark instead of keyword PRINT . In this case, BASIC automatically insert keyword PRINT in place of? mark

EXAMPLE

```
10 Let A =10
20 Let B =5
30 C = A + B
40 Print "Sum = "; C
50 End
Ok
Run
Sum = 15
```

Explanation

In the above example "sum = " is a message which is present in double quotation marks and variable is presented after the word semicolon. In this example C is called variable.

EXERCISE

Q1: Fill in the blanks.

(i)	Beginners All purpose symbolic instruction code		
(ii)	1963	(iii)	Ok
(iv)	Direct	(v)	Line no
(vi)	255	(vii)	65529
(viii)	BAS	(ix)	Reserve words
x)	REM		

Q2: Choose the correct answer.

(i)	B	(ii)	C
(iii)	A	(iv)	B
(v)	A	(vi)	D
(vii)	C	(viii)	A
(ix)	C	(x)	B

Q3: Write T for True and F for False statement.

(i)	T	(ii)	F
(iii)	F	(iv)	F
(v)	T	(vi)	T
(vii)	F	(viii)	T
(ix)	F	(X)	T

Q4: In how many modes, GW-BASIC can operate? Discuss briefly.

MODES OF OPERATION

The way of executing BASIC statements and commands is called mode of operations. A statement or command in BASIC can be run in two modes. These are

1 Direct Mode
2 Indirect Mode

Direct Mode

In direct mode BASIC command or statement is executed as soon as it is typed and Enter key is pressed. The statement is written without a line number. After execution the statement is cleared from the memory.

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Indirect Mode

This mode is used to write a complete program. Each statement of the program is written preceded by a line number. The program written in this mode is stored into the computer memory. The program is executed by RUN command.

Q5: Describe rules of naming variable in GW-BASIC.

RULES FOR NAMING VARIABLES IN GW-BASIC

1. In GW-BASIC a variable name can not be more than 40 characters long.
2. The variable name may contain alphabets, numbers and the decimal point.
3. Te first character in the variable name must be an alphabet.
4. Reserve words cant be used as variables name.
5. Blank spaces are not allowed in variable name.
6. However the last character of a variable name may be a special type declaration character indicating the type of a variable.

Q6: What are type declaration characters? Explain their uses with examples.

Type declaration characters represent the type of variable. Following type declaration characters are recognized in GW-BASIC

Character	Type of variable	Example
$	String variable	Name$
%	Integer variable	Marks%
!	Single-precision variable	Avg!
#	Double precision variable	Area#

Q7: Briefly describe the uses of arithmetic, logical and relational operator.

ARITHMETIC OPERATORS

Arithmetic operators are used to perform arithmetic operations on values. The GW-BASIC defines the following standard arithmetic operators.

Operator Symbol	Purpose	Algebraic Expression	BASIC Expression
+	Used to add two numbers	A + B	A + B
-	Used to Substract one number from another number	A – B	A – B
*	Used to multiply two numbers	A X B	A * B
/	Used to divide two numbers	A / B	A / B
^	Used to compute the exponential power of a number	A^n	A ^ n
MOD	Used as a modulus operator. It divides integer number and returns the reminder as result.	A MOD B	A MOD B
\	Used to divide integer numbers. It divides integer numbers and returns the quotient as result.	A \ B	A \ B

LOGICAL OPERATORS

Logical operators are used to form more complex and useful logical conditions typically, the logical operators are used to combine more than one relational expressions and the resulting expression is called the compound expression. The logical operators used in BASIC are:

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Operator	Meaning
AND	Used to combine two relational expressions and returns True if both expression are True. In this case if first expression is False, the evaluation process is stopped at that point and second expression is not evaluated.
OR	Used to combine two relational expressions and returns True if either of the expressions is True. In this case, if first expression is False, the evaluation process will continue and second expression is evaluated and so on.
NOT	Used to reverser the result of the relational expression. It means that if the condition evaluates to True, the logical operator NOT converts the result to False and vice versa.

RELATIONAL OPERATORS

Relational operators are use to compare two values. They return output as True or False. If result is True then non-zero value is returned. In case of False, 0 value is returned. In BASIC there are six basic relational operators. These are describe below. Suppose a, b and c are three variables having values 4, 11 and 4 respectively.

Operation	Symbol	Expression	Evaluation
Equal to (comparison)	=	A = C	True (non zero)
Less than	<	B < A	False (zero)
Greater than	>	A > C	False (zero)
Less than or Equal to	<=	A <= B	True (non zero)
Greater than or Equal to	>=	B <= A	False (zero)
Not Equal to	<>	A <> B	True (non zero)

Q8: What does it mean by type conversion? Describe rules of type conversion in BASIC.

TYPE CONVERSION:

In BASIC you can convert a value from one data type to another. This is referred to as type conversion.

Rules of Type Conversion:

BASIC performs the type conversion according to the following rules.

1 If a numeric constant of one type is assigned to a numeric variable of a different type, the number is converted according to the type of the variable e.g.

A % = 21 . 63

In the above assignment, the floating point value 21.63 is specified to assign integer type variable A %. The floating point value will be converted to an integer and the fractional portion will be rounded. So value 22 will be assigned to variable A%. similarly, if value is 20.13 is assigned to variable N% then value 20 will be assigned to N%

2 During the evaluation of an expression, all of the operands are converted to the degree of precision of the most precise operand. For example

N # = 12 / 13

In the above assignment statement, arithmetic is performed double precision and result is assigned to N# as a double precision value. So the value 0.9230769230769231 will be assigned to N#

3 A string variable cannot be assigned to a numeric variable.

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Q9: Write a program to read ten values specified in DATA statement and display the sum of these values on the screen.

```
10 Read A,B,C,D,E,F,G,H,I,J
20 Data 5,2,4,8,6,1,3,0,2,7
30 Sum = A+B+C+D+E+F+G+H+I+J
40 Print "Sum of ten numbers is", sum
50 End
```

Q10: Answer the following short questions:

(i) Write the purpose of the function keys i.e, from F1 to F9 in GW-BASIC

Key	Function	Explanation
F1	LIST	Display the contents of a program from RAM of the computer
F2	RUN	Executes or runs the program from RAM
F3	LOAD	Opens a program from hard disk
F4	SAVE	Saves a program from hard disk
F5	CONT	Continues program after stop command
F6	LPT1	Sends output of the program to printer
F7	TRON	Displays line number during execution of the program
F8	TROFF	Stops TRON feature
F9	KEY	It is used with different key functions

(ii) What does IDE stand for? Discuss features of GW-BASIC IDE

IDE stands for Integrated Development Environment. The environment in which a source program can be created, edited, debugged and run is called IDE.

GW-BASIC has very simple IDE. You can create, edit, load and run the BASIC program very easily. It also provides shortcut function keys used for creating, Loading, executing etc. BASIC program.

(iii) Explain the term 'Loading a program'. Why should a program loaded before execution?

The process to bring the saved program from disk into memory is referred to as loading the program. A program must be loaded into memory before execution.

(iv) Differentiate BASIC commands and statements.

Commands	Statements
1 Commands are written in direct mode 2 Commands does not have a line number 3 It show the output when enter key is pressed.	1 Statements are written in indirect mode. 2 It must begin with a line number 3 It show the output when type Run or press F2 key from keyboard

(v) What is the difference between CLEAR command and CLS command?

CLEAR	*CLS*
1. This command is used to clear values assigned to all variables in memory and closed all files in memory. The values in numeric variables set to zero and values in string variables set to null.	1.it is used to clear the screen of the monitor.

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(vi) Write the purpose and syntax of the following commands.

DELETE

Purpose:

To delete program lines or line range of loaded program

Syntax:

Delete [line number 1] [- line number 2]
Delete line number 1 -

KILL:

Purpose:

To delete/ remove a file from the disk

Syntax:

KILL file name

FILES:

Purpose:

To list the names of all files residing on the specified drive.

Syntax:

FILES [pathname]

LIST:

Purpose:

To display a loaded program partially or completely on the screen.

Syntax:

LIST [Line number] – [line number] [,file name]
LIST [Line number -] [file name]

LOAD:

Purpose:

To load a file from disk into memory.

Syntax:

LOAD filename [,r]

SYSTEM:

Purpose:

The command is used to exit from GW-BASIC and return to operating system environment.

Syntax:

SYSTEM

NAME:

Purpose:

To change the name of a disk file.

Syntax:

NAME old file name AS new file name

RENUM:

Purpose:

To renumber program line.

Syntax:

RENUM [new number] , [old number] [, increment]

RUN:

Purpose:

To execute the program currently in memory, or to load a file from the diskette into memory and run it.

Syntax:

RUN [line number] [,r]
RUN filename [,r]

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(vii) Briefly describe the structure of a BASIC program.

Every BASIC program should follow the following rules.

1. Every program statement must begin with a line number.
2. It is a good practice to end every BASIC program with an END statement. However it is not mandatory.
3. Repetition of line numbers within a program is not allowed.
4. Two or more statements can be written on a line but they must be separated by a colon:
5. In BASIC, variables can be used without declaration.
6. In a BASIC program, the physical appearance of the program statements does not matter.

(viii) Differentiate variable and constant.

Variable	Constant
1 Variable are those whose values can be changed during the execution of the program. 2 Variables are represented with the alphabetic letters. 3 For example count, Add etc	1 Constant are those whose values can not be changed during the execution of the program. 2 These are the numeric values 3 For example 5, -2, 4.7 etc

(ix) Write a program that asks for the name, roll number, class, section and marks in different subjects of a student of class 10. The program should calculate and display total marks and percentage of the student.

```
10 CLS
20 INPUT "Enter Name", N$
30 INPUT "Enter Roll Number ", R
40 INPUT "Enter Class", C$
50 INPUT "Enter Section ", S$
60 INPUT "Enter Marks of English", Eng
70 INPUT "Enter Marks of Urdu", Urd
80 INPUT "Enter Marks of Physics", Phy
90 INPUT "Enter Marks of Chemistry", Chm
100 INPUT "Enter Marks of Math", Math
110 INPUT "Enter Marks of Computer", Comp
120 INPUT "Enter Marks of Pak-studies ", PS
130 INPUT "Enter Marks of Islamiat", ISL
140 Total = Eng + Urd + Phy + Chm + Math + Comp + PS + ISL
150 Per = Total / 850 * 100
160 Print "Name of student ", N$
170 Print "Roll No of student", R$
180 Print "Class of student", C$
190 Print "Section of student", S$
200 Print "Total Marks", Total
210 Print "Percentage = ", Per
```

(x) **Write a program to calculate the distance covered by a car moving at an average speed of v ms^{-1} in time t. The program should input average speed v and time t.**

```
10 CLS
20 Input "Enter the velocity", V
30 Input "Enter the Time", T
40 S = V * T
50 Print "Distance Covered = ", S
60 End
```

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(XI) Give an example to explain the use of comma and semi colon with PRINT statement.

Comma:

If comma is used between two expression then the contents of the second parameter will be printed or displayed at eh start of the next zone.

Example:

Print "Computer ", "Science"

Semi colon:

When the two expression in a PRINT statement are separated by a semicolon(;) the second expression is displayed on the screen just after the text of the first expression.

Example:

Print "Computer ";"Science"

Q11: Write a program to calculate the volume of a cylinder. The program should get the values for height of the cylinder and the radius of its base from the user through INPUT statement.

```
10 CLS
20 Input "Enter the Radius", R
30 Input "Enter the Height", H
40 Let V = 3.14 * R ^ 2 * H
50 Print "Volume = ", V
60 End
```

Q12: Write a program to compute the square of a given number. The program should get the number from the user through INPUT statement.

```
10 CLS
20 Input "Enter the Number", A
30 Let S = A ^ 2
50 Print "Square = ", S
60 End
```

Q13: Write a program to calculate and print the sum and average of three numbers using LET statement.

```
10 CLS
20 Let A = 5
30 Let B = 7
40 Let C = 1
50 Let S = A + B + C
70 Let Avg = Sum / 3
80 Print "Sum = ", S
90 Print "Average = ", Avg
60 End
```

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